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PROGRESS ACHIEVED IN FACILITATING AND PROMOTING THE TRANSFER OF ENVIRONMENTALLY SOUND TECHNOLOGY, COOPERATION AND CAPACITY-BUILDING

Report of the Secretary-General

SUMMARY

The UNCED process has been a stimulus to new thinking and initiatives on the transfer of environmentally sound technology, cooperation and capacity-building. The present report provides background information and a framework for the Commission's consideration of chapter 34 of Agenda 21. It highlights emerging trends and issues with respect to the agendas of national Governments, international organizations, non-governmental organizations and the private sector. Initiatives which have been taken to promote the transfer of environmentally sound technology, cooperation and capacity-building are outlined. Issues that may require consideration by the Commission at its current and future sessions are identified.

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INTRODUCTION

1. The General Assembly, in calling upon the Economic and Social Council to establish the Commission on Sustainable Development (Assembly resolution 47/191), placed emphasis on the transfer of environmentally sound technology, cooperation and capacity-building. This reflected the prominence of the issue both in the negotiations leading up to the United Nations Conference on Environment and Development and in Agenda 21, 1/ adopted by the Conference.

2. The functions of the Commission on Sustainable Development related to the transfer of environmentally sound technology, cooperation and capacity-building identified in General Assembly resolution 47/191 are as follows:

(a) To consider information provided by Governments, including information in the form of periodic communications or national reports regarding the activities they undertake to implement Agenda 21, the problems they face, such as those related to financial resources and technology transfer, and other environment and development issues they find relevant;

(b) To review the progress in the implementation of the commitments contained in Agenda 21, including those related to the provision of financial resources and transfer of technology;

(c) To monitor progress in promoting, facilitating and financing, as appropriate, access to and transfer of environmentally sound technologies and corresponding know-how, in particular to developing countries, on favourable terms, including concessional and preferential terms, as mutually agreed, taking into account the need to protect intellectual property rights as well as the special needs of developing countries for the implementation of Agenda 21.

3. By decision 1993/217, the Economic and Social Council approved the provisional agenda for the first session of the Commission on Sustainable Development, which included consideration of the progress achieved in facilitating and promoting the transfer of environmentally sound technology, cooperation and capacity-building.

4. Because of the short period of time between the organizational session of the Commission (February 1993) and the present session, an extensive survey of national experience and the experience of non-governmental organizations with respect to the progress achieved in promoting the transfer of environmentally sound technology, cooperation and capacity-building has not been possible. The matter will have to be taken up in a future report, the exact form and nature of the reporting on national experience to be decided on by the Commission.

5. The present report identifies emerging trends and activities within and outside the United Nations system related to technology transfer and technology-related capacity-building. The report also outlines some key issues the Commission may need to address at its present and future sessions, and related issues raised at the first session of the Commission on Science and Technology for Development, held in April 1993.

6. The organizations of the United Nations system, other international organizations and many Governments are in a transitional phase with respect to the outcome of the UNCED process, reassessing and, where necessary, reorienting existing programmes and activities to reflect the new mandates and requests for action set out in Agenda 21.

7. Agenda 21 as it relates to science and technology is largely focused on issues of technology transfer and related capacity-building for protection of the environment and human resource development. As stated in chapter 34 of Agenda 21:

> "Environmentally sound technologies are not just individual technologies, but total systems which include know-how, procedures, goods and services, and equipment as well as organizational and managerial procedures. This implies that when discussing transfer of technologies, the human resource development and local capacity-building aspects of technology choices, including gender-relevant aspects, should also be addressed. Environmentally sound technologies should be compatible with nationally determined socio-economic, cultural and environmental priorities" (para. 34.3).

8. The activities proposed in chapter 34 are aimed at:

> "improving conditions and processes on information, access to and transfer of technology (including the state-of-the-art technology and related know-how), in particular to developing countries, as well as on capacity-building and cooperative arrangements and partnerships in the field of technology, in order to promote sustainable development" (para. 34.5).

9. The specific activities called for in chapter 34 cover seven programme areas:

(a) Development of international information networks which link national, subregional, regional and international systems;

(b) Support of and promotion of access to transfer of technology;

(c) Improvement of the capacity to develop and manage environmentally sound technologies;

(d) Establishment of a collaborative network of research centres;

(e) Support for programmes of cooperation and assistance;

(f) Technology assessment in support of the management of environmentally sound technology;

(g) Collaborative arrangements and partnerships.

10. In the interest of brevity and to facilitate reporting on chapter 34, items (d), (e) and (g) have been clustered under a single heading called collaborative arrangements.

11. In addition to the range of generic activities proposed in chapter 34, references to the transfer of environmentally sound technology, cooperation and capacity-building are contained in various parts of Agenda 21.

12. To make its task more manageable, the Commission on Sustainable Development may wish to focus its initial review of the transfer of environmentally sound technology, cooperation and capacity-building on chapter 34. Technology transfer and capacity-building as contained in the thematic chapters, such as those on protection of the atmosphere or protection of water resources, could be taken up as those chapters are reviewed. This would have the advantage of providing thematic integration in the sense that such issues as financial resources and technology transfer, in addition to being dealt with on a cross-sectoral basis, would be taken up specifically in reference to the theme under review. Many organizations, both national and international, deal with technology issues as they relate to specific substantive fields rather than in generic terms.

I. TRENDS AND ISSUES RELATED TO THE TRANSFER OF ENVIRONMENTALLY SOUND TECHNOLOGY, COOPERATION AND CAPACITY-BUILDING

13. The general issue of sustainable development and the transfer of environmentally sound technology, cooperation and capacity-building has evolved in the thinking and agendas of national Governments, international organizations, non-governmental organizations and the private sector. Much of this change has resulted from the UNCED process itself and from an evolving public response to environment and development problems.

14. In recent years, there has been a growing international consensus that technology transfer needs to be multidimensional if it is to serve global environmental sustainability needs. Consequently, Governments and intergovernmental organizations have increasingly emphasized the partnership, cooperation and innovative policy-making opportunities inherent in the fabric of the technology transfer process.

15. It is increasingly clear that transfer, cooperation and capacity-building can involve technologies and processes not only from state-of-the-art owners but also from those who have preserved age-old processes that are suitable for environmental sustainability. For example, the agricultural method known as Integrated Pest Management (IPM) is a process rediscovered from developing countries rather than a process developed in an advanced technology laboratory. IPM is currently a sustainable agricultural method promoted both by the agricultural agencies of developed countries and by such international organizations as the Food and Agriculture Organization of the United Nations.

16. Another change in the organizational strategy of international organizations is the growing emphasis on assessing in-house projects for their environmental impact or the inclusion of sustainable development concerns in their organizational programmes. For example, since the late 1980s environmental impact assessment statements have been mandatory for all World Bank projects.

17. Some developed countries have established a "golden carrot programme" to promote the development of technologies that exceed established standards for energy efficiency. This is accomplished in two ways. The first is through the provision of cash rebates to a large but fixed number of first purchasers of products to help ensure a sufficiently large volume of sales and market penetration. While this, in effect, may constitute a subsidy, it is not meant to make energy cheap but to help a new technology penetrate the market. The second component of a "golden carrot" comprises large cash incentives to producers to offset incremental manufacturing costs. Such funds are often raised through consortia of utility manufacturers and other constituencies. 2/

18. As noted in the report of the Secretary-General to the Commission on Science and Technology for Development at its first session (E/CN.16/1993/9):

> "developing countries can gain access to technology by a series of mechanisms, such as the importation of capital goods, foreign direct investment and by obtaining licences. Foreign direct investment, in particular, with its many variations, offers know-how in production processes, management and marketing. Joint ventures are also a way of combining foreign investment and technology transfer. Industry itself decides where to invest, but Governments in developing countries can influence the behaviour of companies to a certain extent by liberalizing the investment climate. Transparency and stability of regulations are important in this respect" (para. 64).

19. Domestic policies and related incentive/disincentive systems play an important role in removing barriers to technology transfer and encouraging the effective application and dissemination of environmentally sound technologies. Agenda 21 encourages activities directed towards the creation of favourable policies, including subsidies and tax policies, as well as other regulations to support and promote the access, transfer and introduction of environmentally sound technologies in all countries.

20. Some of the recognized options that facilitate the transfer of technology include tax incentives for environmental goals, tariff incentives for environmentally sound technologies, and funding of transfers through multilateral and bilateral official development assistance programmes. 3/

21. On the private sector side, there are at least three areas in which changes in the approach to environment and environmentally sound technologies could have a positive effect on the global effort for sustainable development. These include (a) changes in sectoral diversity and level of private sector activities in support of environmentally sound technologies; (b) developments directed towards building a market for technological alternatives for sustainable development; and (c) perceptual and institutional changes regarding environmentally sound technologies.

Sectoral diversity and level of activities

22. The level of business and industry activities in support of environmentally sound technologies has rapidly increased the numbers and types of companies involved and their financial commitments. Environmentally responsible activities are no longer carried out by only a few large companies that can

afford sustained activities in environmental management and technology design. Hundreds of corporations have adopted and are implementing environmental guidelines, 4/ research and development programmes, 5/ and management structures. 6/ In addition, firms of all sizes are financially and institutionally committed to improving the environmental performance of their operations. 7/ Nevertheless, much remains to be done in this area.

23. The sectoral distribution of environmental activities has moved from being limited to a few industrial sectors (such as the chemical and oil industries) to include packaging, agriculture, manufacturing, electronics and durable goods industries, among other sectors. 8/ The financial sector, for its part, is promoting programmes that support sustainable development activities, including environmentally sound technologies. 9/

Building a market for sound technologies

24. The lack of market support institutions for environmentally sound technologies has been one of the most significant barriers to increasing access to sounder technological alternatives. 10/ A rapidly expanding range of financial, analytical and engineering services for the transfer, development and use of environmentally sound technologies is needed to fill this market vacuum in the 1990s.

25. Evidence from the past few years shows a sizeable and rapid market development in environmental goods, services and investments. For example, the world-wide market for environmental goods and services is estimated to double during the 1990s, from US$ 300 billion to US$ 600 billion. 11/ In developing countries, environmental goods and services are estimated to grow by 5 to 25 per cent annually. 11/ In the United States of America alone, the market for environmental technologies and related analytical services is expected to expand by 15 to 20 per cent over the next several years. 12/

26. There is also a considerable growth in the organization of the supply side of environmentally sound technologies. Growing numbers of environmental investment funds are creating a favourable business climate for companies that research, produce and market environmentally sound technologies. World-wide estimates indicate that at least 200 "green funds" will invest in upwards of 500 environment-related technology companies. 13/

Perceptual and institutional shifts

27. A perceptual shift in the private sector with regard to overall environmental responsibility is the most crucial factor in the promotion of environmentally sound technologies. This shift should include changes from short-term to long-term environmentally sound business planning; from reactive to proactive environmental activities; from simple product design to design for product-life-cycle; and, in the case of transnational corporations, from limited environmental responsibility at headquarters to expanded environmental responsibility in corporate international operations.

28. Growing numbers of corporations see the economic benefits of transferring their environmental management expertise to all their international operations, because such transfers not only serve to standardize corporate operations but

also improve a transnational corporation's overall public environmental performance record.

29. Although much remains to be done in changing attitudes and practices, the trends are favourable and indicate that in the implementation of recommendations related to environmentally sound technologies, in chapter 34 and other chapters of Agenda 21, a growing involvement of the private sector can be anticipated, whether it is within firms, between firms or between Governments and the private sector. But in order to support this trend, the processes must bring together businesses within countries and internationally. Governments must continue to focus attention on the need for such a change of attitude and practices.

II. INITIATIVES FOR THE TRANSFER OF ENVIRONMENTALLY SOUND TECHNOLOGY, COOPERATION AND CAPACITY-BUILDING

30. The following are reported initiatives being undertaken by United Nations organizations, the private sector and in some cases Governments and non-governmental organizations. This enumeration is indicative rather than comprehensive. For reasons of space and time, descriptions have been condensed and summarized and in some cases it has been necessary to be selective.

A. Development of international information networks linking national, subregional, regional and international systems

31. The rapid evolution of data collection and information technology makes the development of guidelines and mechanisms for the transfer of information and data, particularly to developing countries, increasingly necessary and feasible. This will require a more efficient use of existing information networks to assist in the appropriate choice, transfer and management of environmentally sound technologies which are emerging or already available on the market.

32. At its first session, the Commission on Science and Technology for Development, in its discussion of technology information dissemination and management, raised the issue of basing programmes on the practices of global business, particularly systems for the rapid and continuous transfer of documents in scientific research. Information systems and information access should be promoted so that developed and developing countries can be more closely linked. Developing countries should have low-cost access to databases. The Commission on Science and Technology for Development was also of the view that building the capacity of developing countries would clearly include the element of building a specific capability for handling information transfer.

33. The United Nations Development Programme (UNDP) is establishing a Sustainable Development Network to facilitate freer and more rapid access to information for users in developing countries; to encourage increased communication about sustainable development; and to enhance the capacity of national institutions to meet their own needs for information and to participate in the Network.

34. At its seventeenth session, in May 1993, the Governing Council of the United Nations Environment Programme (UNEP) authorized initial steps so that UNEP could develop international guidelines on information exchange between exporters and importers regarding the environmental impacts of potentially harmful technologies. The UNEP Cleaner Production Programme is a data network that links the existing sources of information on low- and non-waste technologies and promotes cleaner production worldwide through the International Cleaner Production Information Clearing house (ICPIC). 14/

35. UNEP also established the Ozone Action Information Clearing House (OAIC) in response to the Montreal Protocol on Substances that Deplete the Ozone Layer. This computerized information system contains descriptions of alternative technologies and a database of producers and services related to the reduction of ozone-depleting substances.

36. The Inter-African Seminar for Cooperation and Integration of Science and Technology for Development, which took place in Burundi in November 1992, adopted concrete and action-oriented recommendations with regard to supporting regional and local science and technology organizations. These organizations were considered to be essential in promoting and facilitating the dissemination and management of scientific and technological information.

37. The World Intellectual Property Organization (WIPO) provides advice to Governments on drafting appropriate laws and regulations for intellectual property rights. It also provides training to developing countries on the transfer of environmentally sound technologies that are protected as intellectual property (see E/CN.16/1993/9, para. 94). WIPO created a State-of-the-Art Search Programme to assist institutions and individuals in developing countries in accessing patent information for certain technologies, including descriptions of the extent of novelty involved, ownership and terms of transfer.

38. For the private sector, more accurate and reliable information disclosure is the starting point for contributions to information networks. Examples of progress in private sector environmental information disclosure include a 13 per cent increase of environmental information in company reports, up from 10 per cent less than two years earlier. 15/ Furthermore, some companies themselves are pointing to the need for uniform and independently verified reporting.

39. Truly global environmental information networks, especially for environmentally sound technologies, have yet to be developed. This process will require broad international cooperation and would benefit from the vast information sources and communication networks of the private sector. The business and industry response to an environmentally sustainable production process is leading to a number of largely "local" developments in networking the available information.

40. For example, some companies share environmentally beneficial research and development information with other businesses, including competitors: the Industry Cooperative for Ozone Layer Protection (ICOLP) is a cross-industry group dedicated to sharing information on chlorofluorocarbon (CFC) substitutes with manufacturers, especially in developing countries; 16/ automobile recycling

efforts are bringing auto manufacturers together with their supplier firms and local recyclers to develop information networks for better recycling strategies. 17/

41. Industry associations are also in the process of filling some of the information networking gaps at the international level. For example, the information links through national chapters of the International Chamber of Commerce have already been crucial to the success of a number of environmentally sound technology transfer opportunities in developing countries. 18/

B. Support of and promotion of access to transfer of technology

42. Since technologies that can slow or even reverse the trend of environmental degradation in the atmosphere, biosphere and geosphere are central to the sustainable development objectives of all countries, the demand arises for the international community to support and promote the accessibility and transfer of environmentally sound technologies, especially to developing countries, under conditions that are fair and affordable. The transfer of these technologies should, as appropriate, be associated with activities which ensure their rapid diffusion and thus have a positive effect on the environment in a reasonable time.

43. In response to this need it is recommended, in paragraph 34.18 of Agenda 21, that Governments and international organizations promote, and encourage the private sector to promote, effective modalities for the access and transfer, in particular to developing countries, of environmentally sound technologies through a variety of interrelated activities.

44. The technology programme that emerged from the decisions adopted by UNCTAD at its eighth session (Cartagena de Indias, Colombia, February 1992), has focused on promoting the transfer of technology to developing countries and on building the technological capacities of those countries. The Ad Hoc Working Group on the Interrelationship between Investment and Technology Transfer of the Trade and Development Board of UNCTAD has agreed on a work programme composed of three priority areas, one of which is the transfer and development of environmentally sound technologies. This priority area includes the following two elements relevant to the implementation of Agenda 21: (i) issues involved in the generation, transfer and diffusion of environmentally sound technologies that have an impact on competitiveness and development; and (ii) policies and measures for the promotion, development, dissemination and financing of environmentally sound technologies, particularly in developing countries, taking into account the need to provide incentives to innovators that promote research in and development of these technologies. A workshop on the transfer and development of environmentally sound technologies is scheduled to take place in 1993.

45. At its first session, the Commission on Science and Technology for Development recommended to the Economic and Social Council the adoption of a draft resolution, in which the Council would decide that the Commission should place particular emphasis in its work on the policy issues and options related to the development, transfer and utilization of technologies that promote sustainable development objectives, in accordance with the mandate of the

Commission and taking into account the provisions of Agenda 21 concerning science and technology (E/1993/31, chap. I, draft resolution IV).

46. In addressing the financial implications of those provisions, the Commission on Science and Technology for Development cited the need to provide, on a predictable basis, the necessary financial means to sustain science and technology activities, including those addressed in Agenda 21. In this context, in the same draft resolution, the Economic and Social Council would encourage bilateral and multilateral donors to provide further support for the development, transfer and application of environmentally sound technologies.

47. The Commission on Science and Technology for Development gave particular attention to the issue of organizing a more effective coalition of resources to finance science and technology for development (see E/1993/31, chap. VI). This coalition would draw upon a variety of bilateral and multilateral funding sources. Since the United Nations Conference on Environment and Development did not agree on any separate funding mechanism related to environmentally sound technologies, it would be critical to address the issue in conjunction with various initiatives in related fields, particularly in the field of development financing and environment. 19/

48. The private sector supports other incentive mechanisms such as awards for innovative technology design. For example, the Better Environment Awards of the United Kingdom of Great Britain and Northern Ireland are given to encourage innovative environmental technology designs and management practices. 20/

C. Improvement of the capacity to develop and manage environmentally sound technology

49. The United Nations, first through the Centre for Science and Technology for Development and then the Department of Economic and Social Development, has been developing and promoting a practical programme of endogenous capacity-building based on a series of pilot projects undertaken initially in 10 developing countries to assist them in their efforts to accelerate economic growth and harness the potential of modern science-based technologies.

50. The primary objective of the programme is to enhance the intrinsic capability of developing countries to exercise autonomous and informed judgements on how and where to develop and deploy domestic or external technologies in the fulfilment of their development priorities. The pilot programme aims at assisting interested countries to identify and overcome policy inconsistencies and programmatic gaps in their efforts to harness technology to the service of environment and development.

51. The concept of endogenous capacity-building as used in the pilot programme is not synonymous with indigenous science and/or technology, nor is it wholly subsumed under science and technology infrastructure such as research and development institutions. It includes human resource development and the integration of science and technology into macroeconomic policies and is fully in harmony with sustainable development. In essence, it is the crucial capacity - human and institutional - to decide what science and what technology should be developed domestically, how to obtain access to and negotiate the

transfer of external technologies, and how to harmonize technological change and the growth process, all in the context of long-term sustainable development goals.

52. In this sense, the pilot programme initiative in science and technology is a precursor of and complement to Capacity 21 of UNDP and such other programmes as the African Capacity Building Foundation of the World Bank. The pilot programme has been widely appreciated and endorsed in broad terms by the Organisation for Economic Co-operation and Development (OECD). It was also reviewed at a meeting of a group of donor organizations that included the International Development Research Centre and the Swedish Agency for Research Cooperation with Developing Countries (SAREC). Although pilot in nature, the programme covers a wide spectrum of countries and the empirical data gathered and the analyses made could provide a conceptual and operational basis, with appropriate adjustments, for other countries and bilateral donor organizations.

53. At its first session, the Commission on Science and Technology for Development expressed its approval of the pilot programme in terms of "the underlying concepts, methodologies and approach that emphasized de facto national execution under the leadership of a National Steering Committee consisting of representative stakeholders drawn from among policy makers, industries, the private sector, the science and technology community and financial and educational institutions" (E/1993/31, chap. III, para. 12).

54. The Commission suggested that "a comprehensive programme on endogenous capacity-building relevant to Agenda 21 be developed which could help in achieving the objective of making the transition to environmentally sustainable technologies" (E/1993/31, chap. III, para. 11). It identified this as a key task on which they could provide leadership. The manner in which the Commission on Sustainable Development and the Commission on Science and Technology for Development would cooperate and coordinate their activities in this regard should be fully discussed as both bodies have a joint interest in the topic.

55. UNDP has initiated Capacity 21, the objective of which is to assist countries in (a) formulating strategies that integrate environment and development; (b) identifying priority areas of Agenda 21 on which they wish to focus their efforts; (c) identifying major capacity-building requirements on which countries would like to take immediate action as a way of implementing national Agenda 21 and sustainable development plans; and (d) formulating programmes and projects to meet capacity-building requirements by strengthening national or regional scientific and technological research and development. This would include promoting the development of databases and disseminating knowledge and information and increasing the participation of the population in the decision-making process.

56. Responding to the challenge of Agenda 21, the World Engineering Partnership for Sustainable Development, representing about 12 million engineers, has focused on the change of work methods needed to achieve sustainable development objectives. A framework based on Agenda 21 has been established to guide the work of engineers all over the world. The organization has also set short-term goals such as establishing regional centres to support global sustainable development. It decided that development projects that did not include changes as in engineering practices should not be funded. 21/

57. The Union of International Technical Associations has devoted priority attention to sustainable development and environmentally sound energy technologies. In this regard, the Union is organizing jointly with the United Nations Educational, Scientific and Cultural Organization an International Congress of Engineering Deans and Industry Leaders which aims at developing a dialogue for directing the engineering profession and engineering research towards the needs of the economy and the constraints of the environment.

58. On the private sector side, there are numerous positive examples of capacity-building initiatives. Business and industry already see training in environmentally sound technologies in its broadest meaning. As one industry representative put it, "technology transfer is not just putting together a set of blueprints and faxing them out to [developing countries]. There is a whole educational process that goes with it and a structure to be sure local managers are trained to use the technology". 22/ Examples of industry-led environmental training efforts include that of the International Centre for Environmental Technology (ICET) which was established by private enterprises in Japan in 1991. ICET is currently conducting the "10,000 Training" project, which aims at training 10,000 trainees from developing countries about advanced environmental and energy technologies over 10 years. 23/

D. Technology assessment in support of the management of environmentally sound technology

59. The lack of appropriate equipment and knowledge to assess the environmental impact of technologies has resulted, at times, in the transfer and application of technologies that do not protect the environment. Agenda 21 emphasizes the need for the international community to support the networking of technology assessment institutions at national, subregional and regional levels for the exchange of information and expertise in technology assessment. A more participatory decision-making process is advocated, aiming at promoting communication and cooperation between international organizations, national and local governments and non-governmental organizations in the area of technology assessment.

60. The Advanced Technology Assessment System (ATAS) was established by the former Centre for Science and Technology for Development of the Secretariat as a vehicle for strengthening the scientific and technological capacities of developing countries through technology assessment and information exchange. Through ATAS, national and regional workshops are organized to assess specific technologies and to bring these assessments into the mainstream of development planning and decision-making. The results of these workshops and other activities are regularly published in the ATAS Bulletin.

61. With regard to workshops and meetings on assessment methodology and management, the International Expert Group Meeting on Technology Assessment, Monitoring and Forecasting was held in Paris from 25 to 28 January 1993 and the Regional Training Workshop on Technology Assessment and Management is to be held at Shanghai in June 1993. These meetings were organized by the Department of Economic and Social Development, in cooperation with UNESCO, UNDP and the Government of China, respectively.

62. Many developed countries have established organizational units for technology assessment. These units are usually situated within either executive or legislative branches of Governments and are intended to exert a direct influence on national decision-making. A number of technology assessment organizations have also been set up within developing countries, with varying degrees of institutional success. In general, developing countries need assistance with institution-building, including methodological and managerial training and networking.

63. During the International Expert Group Meeting in Paris, a special meeting of non-governmental organizations was organized to discuss the idea of creating an international non-governmental organization or network for technology assessment. The objectives would be to (a) mobilize technology assessment capacities in the service of sustainable development, particularly for the benefit of developing countries; (b) link the technology assessment capacities and initiatives of the developing countries to those of the developed countries; and (c) promote technology assessment in participatory decision-making processes in developing countries. The first session of the organizing committee of this new body will take place in Bergen, Norway in July 1993.

E. Collaborative arrangements

Establishment of a collaborative network of research centres

64. The International Environmental Technology Centre was recently inaugurated in Osaka, Japan, sponsored by UNEP and the Government of Japan. The Centre will provide information, training and consulting services on technologies used in environmental protection and enhancement of urban areas and freshwater lakes for the benefit of developing countries. 14/

65. The Global Change System for Analysis, Research and Training (START) was established to provide a conceptual framework for interconnected regional networks for research and training on global environmental change, its causes and effects. The START concept involves intraregional as well as interregional collaboration and entails the establishment of regional research networks. The purpose is to develop indigenous regional capacity to promote research on the regional origin and impact of global environmental changes. START efforts are funded by the Global Environment Facility (GEF) through UNDP as well as by voluntary contributions from national sources.

66. The Third World Academy of Sciences (TWAS) has indicated its intention to establish a network of 20 international centres for science, technology and environment for selected countries of Africa, Asia and Latin America. These would be centres of excellence providing among other activities, a large training programme aimed at increasing the number of scientists in developing countries. This initiative would support bridging the economic gap between developed and developing countries. These centres of excellence would also play a role in the preservation of the environment. 24/

67. Several countries (Egypt and Malaysia, for example) are undertaking initiatives focused on solving pressing problems related to food security and environmental pollution through such things as science parks and centres for

environmental technologies. Such centres undertake environmental research and development of environmentally sound technologies and provide information on environmental issues facing the country. They provide advice and technical services to government and the private sector by means of education, training and conducting conferences on subjects related to the environment. 25/

68. Business-to-business collaboration in establishing research facilities is also under way. For example, in 1991, several enterprises established the Research Institute for Innovative Technology for the Earth (RITE) in Japan. RITE conducts research and development on energy conservation, alternative energy technologies and technologies for the next generation.

69. Another research collaboration that involves the private sector (especially transnational corporations) is the traditional research and development links between companies and major universities. These links help develop new technological alternatives that meet voluntary industry or regulatory government environmental specifications. They also enable engineering and business management students to become involved in environmentally sound management and technology development from the earliest stages of their careers.

Support for programmes of cooperation and assistance

70. The International Council of Scientific Unions (ICSU) has initiated a project aimed at developing scientific and technological education in the context of sustainable development. This project would contribute to the establishment of an international framework to provide scientific guidance for developing environmentally sound and sustainable policies.

71. The UNESCO programme on science, technology and society has been designed to promote public awareness of the potential of science and technology to solve existing problems. Specific attention is paid to the importance of creating "new, moral foundations" for ecologically sound and economically sustainable development.

72. Examples of business-to-business support and cooperation include links between corporations and local subcontractors and suppliers. For example, the International Chamber of Commerce (ICC) encourages its members to carefully evaluate the environmental conduct of their contractors. 26/

Collaborative arrangements and partnerships

73. A Global Technology Partnership Initiative was launched in March 1993 to encourage the transfer of environmentally sound technologies and know-how to rapidly industrializing developing countries on commercial terms. 27/

74. The Business Council for Sustainable Development, in cooperation with the International Finance Corporation, UNDP and UNEP, is forming a government/business partnership to encourage and facilitate eco-efficient projects involving technology cooperation, particularly by means of high-level policy dialogue. An essential function of this partnership programme would be to identify technology gaps and new technologies and to identify obstacles to effective commercially based technology cooperation. 28/

75. The Organization of American States (OAS) adopted the Inter-American Program of Action for Environmental Protection. An important provision, among others, is directed towards promoting cooperation between developed and developing countries in the transfer of new and environmentally sound technologies. Particular emphasis is given to technologies that facilitate energy savings, especially in the transportation sector.

76. Three Japanese corporations created the "New Earth 21" project in conjunction with the Research Institute for Innovative Technology for the Earth (RITE) and the Japanese Government. "New Earth 21" aims at conducting research on biological carbon dioxide fixation through the use of microorganisms. 29/

77. A recent bio-remediation project for the first time involved private companies working with other engineering and construction firms, government agencies, and a major university to successfully transfer a new waste treatment technology from the laboratory to the field. 30/

78. A recent CFC-113 elimination effort involved a joint venture between Mexico and several outside concerns, in which a private telecommunications company voluntarily shared experience and managed a three-year training programme for Mexican industry. 31/

III. ISSUES CONCERNING THE FUTURE WORK OF THE COMMISSION ON SUSTAINABLE DEVELOPMENT

79. For the Commission on Sustainable Development to give appropriate and full consideration to the implementation and review of issues related to the transfer of environmentally sound technology, cooperation and capacity-building, it may wish to consider ways and means of (a) coordinating intergovernmental discussions and decision-making on issues related to chapter 34 of Agenda 21, as appropriate; (b) ensuring that issues related to technology transfer and capacity-building are also taken up within the context of relevant thematic chapters of Agenda 21; (c) enlisting the contributions of the organs, organizations and bodies of the United Nations system; (d) requesting Governments to support the work of the Commission with respect, inter alia, to chapter 34 of Agenda 21; and (e) monitoring cooperation between Governments, international organizations and the private sector, giving special attention to new agreements, projects, programmes and activities that incorporate provisions for technology transfer and related capacity-building.

80. Many of the issues and programmes outlined in chapter 34 of Agenda 21, overlap with the mandates of other intergovernmental bodies within the United Nations, as well as with the mandates of the governing bodies of specialized agencies. The prominent examples among intergovernmental bodies are the Commission on Science and Technology for Development; the Commission on Transnational Corporations; and the Trade and Development Board of UNCTAD; all three have met since the adoption of Agenda 21. The Commission may wish to consider how best to interact with these bodies in ways that go beyond the transmission of reports and recommendations, in order to avoid duplication of effort and to ensure a coordinated policy. This might include, for example, the setting up of joint panels; the harmonization of work programmes; and joint interaction with the private and non-governmental sectors.

81. Other intergovernmental bodies of particular relevance to the Commission in relation to the issue of the transfer of environmentally sound technology, cooperation and capacity-building include the Industrial Development Board of the United Nations Industrial Development Organization, the Governing Council of the United Nations Environment Programme, the Commission on Human Settlements, the Governing Council of the United Nations Development Programme, with particular reference to Capacity 21, and the World Bank.

82. In particular, the Commission may wish to discuss the feasibility of intersessional meetings of its own Bureau with the bureaux of the Commission on Science and Technology for Development, the Commission on Transnational Corporations and the Trade and Development Board, as well as any others it may consider relevant. Such joint bureau meetings could coordinate the agendas of the intergovernmental bodies and generally harmonize consideration of issues concerning the transfer of environmentally sound technology, cooperation and capacity-building.

83. The need to develop information networks linking national, subregional, regional and international systems is specifically identified in chapter 34 and other chapters of Agenda 21. Indeed, the need for improved information and data-processing systems is evident in most chapters of Agenda 21 and may need to be addressed on a cross-sectoral basis. At the present time, several information systems and networks are in the process of being created - the Sustainable Development Network of UNDP, for example. While decentralized systems may reach more users than a single centralized system, there is a need for better coordination among systems and for standardization of data collection and retrieval. The Commission may wish to review the current situation and recommend modalities for coordination and standardization among various information systems related to the transfer of environmentally sound technology, cooperation and capacity-building.

84. The Commission may also wish to consider inviting Governments to prepare and submit information on their respective national situations, policies and programmes, as well as proposals related to selected topics, within the framework of chapter 34 of Agenda 21. Such reports would provide essential information against which future developments and progress could be measured more accurately. Particular attention could be given to intergovernmental and corporate agreements that provide for the transfer of environmentally sound technology, cooperation and capacity-building.

85. Capacity-building for technology transfer intersects with many programme areas covered by United Nations organizations. In addition, increasing numbers of non-governmental organizations are involved. The Commission may wish to recommend that bilateral and multilateral donors, as well as national Governments, ensure adequate financing for these capacity-building activities.

86. In the area of technology assessment, increasing attention needs to be placed on building and strengthening national capacities which link assessment to decision-making. Emphasis is also needed on coordinating the many different technology assessment activities within the United Nations system, centralizing information on similar activities being undertaken by national Governments, non-governmental organizations and the private sector, and standardizing methodologies for assessment. The Commission may wish to consider the need for

a focal point for technology assessment within the United Nations system which could serve both as a clearing house for information and referrals and oversee work on methodologies and their standardization.

87. Support and promotion of access to the transfer of technology is directly related to commitments made as part of the international agreements and conventions on the environment. These commitments are closely related to commitments on financing. The Commission may wish to consider how best to monitor the implementation of these commitments.

88. Finally, the Commission may wish to recommend measures to facilitate inter-agency activities for monitoring environmental emergencies resulting from the poor or inappropriate application of technologies, with a view to establishing an early warning system to avoid possible disasters. This could be considered in conjunction with the early warning systems developed by UNEP and other United Nations entities.

Notes

1/ Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8), resolution 1, annex II. Throughout Agenda 21, the term "environmentally sound" means "environmentally safe and sound", in particular when applied to the terms "energy sources", "energy supplies", "energy systems" and "technology" or "technologies".

2/ Report of the Secretary-General on the utilization of energy technologies, focusing on policy issues and options for the effective transfer and application of environmentally sound energy technologies (E/CN.16/1993/9), paras. 40-41.

3/ Ibid., sect. II.C.

4/ For example, Principle 13 of the Business Charter of the International Chamber of Commerce reads: "to contribute to the transfer of environmentally sound technology and management methods throughout the industrial and public sectors". The Business Charter for Sustainable Development (Paris, International Chamber of Commerce, 1991).

5/ For example, 3M's current annual expenditure for research on environmental improvements in products and processes is about $100 million. Du Pont will have invested close to $1 billion for its research and marketing of chlorofluorocarbon alternatives by the end of the decade.

6/ See Environmental Management in Transnational Corporations: Report of the Benchmark Corporate Environmental Survey (to be issued as a United Nations publication in 1993).

7/ For example, according to the Manager of Marketing Analysis and Planning of M. W. Kellog, today's chemical industry allocates up to 15-25 per cent of the cost of a new plant to investments in environmental management. See Chemical Week, 20 January 1993.

8/ This diversification has been largely the effect of governmental regulatory pressures, especially in the industrialized countries. However, regulatory pressures are no longer the only cause of growing business and industry environmental awareness: the private sector is increasingly seeing the economic benefits of running a "green" company.

9/ Several large commercial banks have specific environmental guidelines for loans and investments. The Bank of America's environmental policies include withholding the Bank's resources from companies that engage in environmentally unacceptable operations and giving special consideration to businesses that benefit the environment. Other banks with similar environmental programmes are the Bank of Boston of the United States and Okobank of Germany. The latter was specifically created to support environmental markets; it prefers to invest in firms that focus on environmental prevention rather than environmental clean-up. See Investor Responsibility Research Center, Investor's Environmental Report, Summer 1991.

10/ For a discussion of market barriers to environmentally sound technologies and suggested market incentive options to reduce the barriers, see Technology Transfer: Options for Sustainable Development (to be issued as a United Nations publication in 1993).

11/ World Bank/International Finance Corporation. "Market for environmental goods and services will balloon in 1990's", World Bank News, vol. XI, No. 20 (21 May 1992).

12/ "From the ground up", Nation's Business, January 1991.

13/ Financial Times, 19 August 1992.

14/ See the note by the Executive Director of the United Nations Environment Programme on issues arising from the resolutions of the General Assembly at its forty-seventh session on the recommendations of the United Nations Conference on Environment and Development (UNEP/GC.17/27).

15/ Financial Times, 16 September 1992.

16/ J. Williams and U. Golub, From Ideas to Action: Business and Sustainable Development (Oslo, Gyledendal, 1992), p. 222. Written under the auspices of the International Chamber of Commerce.

17/ Presentation on Fiat's recycling programme made by Paolo Scolari, Vice-President of Fiat S.p.A., at the nineteenth session of the Commission on Transnational Corporations, in April 1993.

18/ See Touche Ross, Global Climate Change: The Role of Technology Transfer, a report for UNCED financed by the United Kingdom Department of Trade and Industry and the Overseas Development Administration, 1991; and Gordon MacDonald, "Technology transfer: the climate change challenge", The Journal of Environment and Development, vol. I, No. 1 (Summer 1991), pp. 1-39.

19/ Report of the Secretary-General on the organization of a coalition of resources to finance science and technology for development (E/CN.16/1993/10), sect. I.B.

20/ The Better Environment Awards are sponsored by the Environment Foundation, the Department of the Environment and Shell UK, and promoted by the Confederation of British Industry and the Financial Times. Among the awards presented in 1991 were a catalytic technology for destruction of chlorinated caustic effluent streams (developed by ICI); a liquid de-icer that is harmless to groundwater (developed by BP); an environmental management award (to the Body Shop) and a water-power turbine for irrigation that can be easily produced, maintained and used by developing country populations (developed by two independent consulting engineers).

21/ World Engineering Partnership for Sustainable Development, Information Paper, p. 1, and Agenda 21 Focus Group Summary, pp. 1-3.

22/ Arthur D. Little, Inc. and Business International, Managing the Global Environmental Challenge (Business International, New York, 1992).

23/ Shinji Fukukawa, "Japan's policy for sustainable development", Columbia Journal of World Business, Fall/Winter, 1992, pp. 96-105.

24/ The Third World Foundation of North America, "A program for sustainable development" (Hampton, Virginia, United States of America), p. 1.

25/ Malaysia Centre for Environmental Technologies, Information Paper, p. 4.

26/ See Business Charter for Sustainable Development (Paris, International Chamber of Commerce, 1991).

27/ The Initiative resulted from the Global Technology Partnership Conference, held in Birmingham, United Kingdom of Great Britain and Northern Ireland. It will run for three years.

28/ Business Council for Sustainable Development, "Work Program 1993", Information Paper (Geneva, Switzerland), p. 6.

29/ In Business, December 1992.

30/ BIC Journal, December 1989/January 1990.

31/ Northern Telecom, the Mexican Department of Urban Development and Ecology (SEDUE), the Mexican Federation of Private Sector Industry Associations (CANACINTRA), the United States Environmental Protection Agency and the United States-based Industry Cooperative for Ozone Layer Protection were involved in the joint venture.